

PATENT APPLICATION

PROCESSING PLATFORM FOR A GAMING MACHINE

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PROCESSING PLATFORM FOR A GAMING MACHINE

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BACKGROUND OF THE INVENTION

1. Field Of The Invention

The present invention relates to a processing platform for operation of a gaming machine, and more particularly, to a processing platform for operation of a gaming machine that includes a general computing subsystem and a gaming processing subsystem.

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2. Description Of The Prior Art

Slot machine designs are growing in complexity. Regulation and control of modern gaming devices has also correspondingly become complex. Thus, protecting the public from improper machine operation has become a daunting task. Regulation aimed at close control of slot machine design has resulted in greater machine design diversity thereby compounding the complexity of machine control.

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Various bodies of gaming law have a variety of technical and legal requirements. These requirements impact slot machine designs in many ways. Security, randomness, payback percentage, game play history, code verification and accounting for all facets of game operation are commonly regulated operational characteristics of slot machines. These regulations often limit slot machine designers. To meet technical requirements, engineers are often faced with complex operations. These operations delay machine start up, lead to complex human attendant operations, and increase opportunity for error.

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In current gaming machines, processing platforms are adopted to allow various player features while also supporting features required by various gaming regulatory bodies. As computer and computer software advancements are made, gaming machine manufacturers constantly update designs for complete gaming platforms that require extensive engineering effort and time consuming regulatory submittal and testing. The constant re-design and engineering results in diverse implementations of regulated

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machine functions that are fundamental elements of any gaming device. This constant re-design and engineering results in great expense. The diversity of these implementations causes increased complexity for operators and regulatory agencies.

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SUMMARY OF THE INVENTION

A processing platform for operation of a gaming machine in accordance with the present invention includes a bus, a gaming processing subsystem for controlling aspects of gaming machine operation that involve game functionality and thus are generally subject to regulation coupled to the bus and a general computing subsystem for
10 controlling aspects of gaming machine operation that do not involve game functionality and thus are not generally subject to regulation. The general computing subsystem is also coupled to the bus and the gaming processing subsystem is physically separate from the general computing subsystem.

In accordance with one aspect of the present invention, the bus uses an
15 interface protocol that consists of one of PCI, ISA, VME and AGP.

In accordance with another aspect of the present invention, the aspects of gaming machine operation that involve game functionality and are more likely to be the subject of regulation include game play history, game accounting, gaming machine access, I/O control, random number generation and game authentication algorithms.

20 In accordance with a further aspect of the present invention, the aspects of gaming machine operation that do not involve game functionality and are less likely to be the subject of regulation include player visual display and attract animation, audio player feedback and attraction, real time video presentations, and commercial operating systems.

Accordingly, the processing platform for operation of a gaming machine in
25 accordance with the present invention allows for the processing to be performed by two physically separate subsystems, one directed to the actual gaming processing and the other directed to general computing processing. Thus, gaming regulatory agencies will be able to regulate and approve the gaming processing subsystem with regard to, for example, functional aspects of gaming related to game play history, gaming accounting,
30 gaming machine access, input/output control, random number generation, game authentication algorithms, and general issues related to gaming and money, such as pay tables, that are necessary for protecting players, i.e., consumers. At the same time, gaming machine manufacturers are able to improve and upgrade gaming machines with

ever improving hardware and software for better graphics and sound related to playing the game, graphics and sound for attracting players to the game, and other aspects generally related to non-functional entertainment features with the gaming machines. Hence, once a regulatory agency approves a gaming processing subsystem, that game processing subsystem may be used with general computing subsystems to control and operate gaming machines. Accordingly, gaming machines can quickly and easily be upgraded, changed, and developed with a reduced need for gaming regulatory agency testing and approval.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic illustration of a processing platform for operation of a gaming machine in accordance with the present invention; and

Figure 2 is a schematic illustration of a gaming machine including a processing platform for operation thereof in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EXEMPLARY EMBODIMENTS

A processing platform 10 for operation of a gaming machine is schematically illustrated in Figure 1. The processing platform is preferably subdivided into two separate primary subsystems 11, 12 coupled to bus 13. General computing platform 11 controls software and hardware needed to support display, sound and other non-gaming critical functions while gaming processing platform 12 controls primary gaming operations.

Preferably, the general computing platform or subsystem consists of a common PC-type personal computer and therefore preferably consists of a PCI type expansion card that includes bus interface 14. The general computing platform may consist of multiple cards if desired or needed. Preferably, general computing platform 11 communicates with gaming processing platform 12 with a series of software driven API-type calls. The general computing subsystem preferably controls or operates, for example, player visual displays and attraction animation features of the gaming machine; audio player feedback in player attraction features of the gaming machine; real time video presentations; and any commercial operating system present within the gaming machine.

Gaming processing platform or subsystem 12 is preferably also constructed on a standard PCI type expansion card that includes bus interface 15.

Preferably, the gaming processing platform consists of a single card, but may consist of multiple cards if desired. This peripheral component interface serves as the controller of all gaming specific operations. These gaming operations preferably include, for example, game play history, i.e., what is played, what has been displayed, etc.; game accounting, i.e., money coming in and out; gaming machine access, i.e., doors opening on the gaming machine, when the door was opened, etc.; input/output control, i.e., user interface, such as buttons, handles, coin acceptors; random number generation; and game authentication algorithms. Accordingly, it should be apparent that gaming processing platform 12 generally controls gambling or gaming aspects associated with the gaming machine or system that are typically important to the integrity and security of the game, and thus generally are subject to regulation by gaming authorities or gaming regulation agencies.

The gaming processing subsystem board preferably consists of a PCI half-length card. This card may be fitted to any processor architecture that supports PCI. The gaming processing card will have a processor 20, which will control the gaming machine I/O including communications. Additionally, the gaming processing card preferably will include all gaming random number generation functionality, data table information that pertains to payout information stored in a non-volatile memory area 21. This design of a gaming processing platform allows any PC or other processor architecture to be quickly adopted as a gaming machine platform and minimizes any custom or in-house non-standard work, such as software and hardware relating to improved graphics and sounds for general computing operations. Because all game outcome and paying information is generated, backed-up and controlled on the gaming processing platform, a reduction in the number of gaming approvals by gaming regulatory agencies may be achieved.

The gaming processing board also preferably includes a data memory socket 22 that accommodates existing data proms from older gaming devices, such as S-Plus machines (SSPROMs) and PE-Plus machines (XP type data proms), both manufactured by International Game Technology. Since all communications are coupled to hardware on the gaming processing board, money devices, such as bill validators, are ultimately controlled by the gaming processing board.

Preferably, the gaming processing board further includes serial UARTS 23 that are part of the input/output control. Serial UARTS communicate with the various games and communicate various information in and out of the game. Furthermore, the gaming processing board also includes the controls 24 for communications external of the

gaming machine, for example, information relating to large progressive jackpots among a general type of machine, i.e., when the machines are part of a larger gaming subsystem, and information relating to the amount of coins in, coins out and wins being fed to a central computing location.

5 Sub. C' > Figure 2 illustrates a gaming machine 30 that includes a housing 31, at least one user input 32 coupled to the housing, a display 33, such as, for example, a CRT, LCD or plasma display, coupled to the housing, a money input 34 (for example, coin slot, bill validator, coupon acceptor, smart card reader, credit/debit card reader, or other devices for accepting currency or credit), and a money output 35 (for example, coin
10 chute, ticket printer, smart card writer, or other devices for issuing currency or credit). The gaming machine includes a control system 34 that includes processing platform 10 consisting of gaming processing subsystem 12 and the general computing subsystem 11.

Accordingly, the present invention provides a processing platform for operation of a gaming machine and allows for the creation and approval of various
15 gaming processing subsystems or boards that can be coupled with general computing subsystems or boards that control features of the gaming machine operation that are not essential to regulatory aspects of the device. Therefore, these general computing subsystems or boards may be continually and easily changed and upgraded. This allows for rapid and easy development of gaming machines to continually upgrade the appeal
20 and entertainment factors related to gaming machines. Furthermore, a processing platform for operation of a gaming machine in accordance with the present invention allows for better security with respect to gaming aspects while allowing a completely open architecture gaming platform.

The present invention has been described using the standard PCI
25 computing interface. However, those skilled in the art will recognize that other standard computing interfaces, such as, for example, ISA, VME, and AGP may also be employed. Furthermore, the present invention has been described with respect to being contained within a gaming machine. Those skilled in the art will recognize that any or all of the processing platform may be external to the gaming machine such as, for example, in the
30 case wherein a central control system exists for controlling one or more gaming machines.

Although the invention has been described with reference to specific exemplary embodiments, it will be appreciated that it is intended to cover all modifications and equivalents within the scope of the appended claims.

1. A method of determining a value of a function of a variable, the method comprising:
2. receiving a value of the variable;
3. determining a value of the function of the variable based on the received value;
4. outputting the determined value of the function of the variable.